

Applying New Technologies to Transform Marine Natural Products Discovery \$320,000

The Harbor Branch Oceanographic Institute Foundation supported this project of the Marine Biomedical & Biotechnology Research Program at FAU Harbor Branch. This MBBR Program:

"... has been involved in the search for potential new medicines from marine organisms for nearly 20 years. Deep-water marine invertebrates and the microorganisms associated with them have been the focus of this group resulting in the discovery of a number of novel compounds with therapeutic potential. Discoveries have been made in-house as well as in collaboration with academic groups, biotechnology companies and the pharmaceutical industry ... [this] repository contains over 30,000 frozen macro-organism specimens and 16,500 microbial isolates. A proprietary database records collection data including site descriptions (e.g. location, habitat, depth, temperature and conductivity) and biological descriptors (e.g. taxonomy, color, morphology, and observed associations). The database also tracks bioactivity data as the samples are tested. This information facilitates a rapid survey of the collection for identification of additional source organisms, related taxa, habitat and bioactivity data. The [Program] also maintains a repository of the pure compounds isolated since the beginning of the program. A database containing the structure, source, depth of collection, bioactivity and patent information is also kept in conjunction with the library. This information can be provided when samples are transferred to collaborators for further evaluation.

SOURCE: <https://fau.digital.flvc.org/islandora/object/fau%3A5543/datastream/OBJ/view>

This project focused on using unique assets of HBOI (the macro and micro-organism collections) and the new high content imaging (HCI) system to revolutionize how we visualize and test for active materials. Funds were requested to implement the HCI system across three major areas of research: cancer drug discovery, antibiotic discovery and sustainable supply of marine derived compounds. Funds were also requested to increase the number of fractions in our enriched chemical fraction library enabling us to reveal entirely new classes of molecules with new therapeutic activities hidden within our collection. In this project we will use the high content imaging system to: assay for compounds that modulate the immune response to tumors; assay for compounds that block formation of microbial biofilms which can cause antibiotic resistance and persistent infection; and develop methods to co-culture cells of the organisms that produce these compounds. We will also expand our collaborations.

Under the overarching goal to implement new methods in Natural Products Discovery, accomplished objectives included:

- Implemented New High Content Screening Assays in Cancer Immunology
- Implemented New Assays to Transform Antibiotic Drug Discovery
- Enabled discovery of new structures from the BMR Repository through expansion of the peak library
- Developed innovative approaches to produce natural products and understand factors driving biosynthesis

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OUR COMMITMENTS: YESTERDAY, TODAY, TOMORROW

HBOIF looks forward to continuing to serve FAU Harbor Branch by realizing the founder's vision of fostering meaningful oceanographic research and ensuring FAU Harbor Branch remains the premier leader for
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